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(6) The physical medium on which signals are carried across the Attachment Unit Interface (AUI) for 10BASE-T or Media Independent Interface (MII) for 100BASE-T. For 10BASE-T, the data and control circuits consist of an A circuit and a B circuit forming a balanced transmission system so that the signal carrier on the B circuit is the inverse of the signal carried on the A circuit. (C/LM) 802.3-1998

circuit analyzer (multimeter) The combination in a single enclosure of a plurality of instruments or instrument circuits for use in measuring two or more electrical quantities in a circuit. *See also:* instrument. (EEC/PE) [119]

circuit, balanced *See:* balanced circuit.

circuit board A flat piece of insulating material, often multi-layered, constituted of epoxy-glass or phenolic resin, on which electrical components are mounted and interconnected by etched copper foil so patterned as to form a circuit. *Note:* Sometimes referred to as a "board" or a "card." *See also:* printed circuit board. (C) 610.10-1994w

circuit bonding jumper The connection between portions of a conductor in a circuit to maintain required ampacity of the circuit. (NESC/NEC) [86]

circuit breaker (1) (general) (thyristor) A device designed to open and close a circuit by nonautomatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating. *Notes:* 1. A circuit breaker is usually intended to operate infrequently, although some types are suitable for frequent operation.

(NESC/IA/IPC/PKG) 428-1981w, [86], 333-1980w

(2) A switching device capable of making, carrying, and breaking currents under normal circuit conditions and also making, carrying for a specified time, and breaking currents under specified abnormal conditions such as those of short circuit. (NESC) C2-1997

(3) (packaging machinery) An automatic device designed to open under abnormal conditions a current-carrying circuit without damage to itself. (IA/PKG) 333-1980w

(4) (hydroelectric power plants) A fast-acting switching device used to close and open an electric circuit and capable of interruption of fault currents. (PE/EDPG) 1020-1988r

(5) A mechanical switching device, capable of making, carrying, and breaking currents under normal circuit conditions and also, making and carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short circuit. *Notes:* 1. A circuit breaker is usually intended to operate infrequently, although some types are for frequent operation. 2. The medium in which circuit interruption is performed may be designated by suitable prefix, that is, airblast circuit breaker, air circuit breaker, compressed-air circuit breaker, gas circuit breaker, oil circuit breaker, vacuum circuit breaker, oilless circuit breaker, etc. 3. Circuit breakers are classified according to their application or characteristics and these classifications are designated by the following modifying words or clauses delineating the several fields of application, or pertinent characteristics: High-voltage power—Rated above 1000 V ac. Molded-case—*See* separate definition. Low-voltage power—Rated 1000 V ac or below, or 300 V dc and below, but not including molded-case circuit breakers. Direct-current low-voltage power circuit breakers are subdivided according to their specified ability to limit fault-current magnitude by being called general purpose, high-speed, semi-high-speed, rectifier or anode. For specifications of these restrictions see latest revision of the applicable standard. (SWG/PE) C37.100-1992

circuit-breaker compartment (1) That portion of a switchgear assembly that contains one circuit breaker and the associated primary conductors and secondary control connection devices including current transformers. (SWG/PE) C37.20.1-1993r

(2) That portion of the switchgear assembly that contains one circuit breaker or other removable primary interrupting device and the associated primary conductors.

(SWG/PE) C37.20.2-1993

circuit breaker downtime Time from the discovery of the failure until the breaker is returned to service.

(SWG/PE) C37.10-1995

circuit breaker, field discharge A circuit breaker having main contacts for energizing and deenergizing the field of a generator, motor, synchronous condenser, or rotating exciter, and having discharge contacts for short-circuiting the field through the discharge resistor at the instant preceding the opening of the circuit-breaker main contacts. The discharge contacts also disconnect the field from the discharge resistor at the instant following the closing of the main contacts. For direct-current generator operation, the discharge contacts may open before the main contacts close. *Note:* When used in the main field circuit of an alternating- or direct-current generator, motor, or synchronous condenser, the circuit breaker is designated as a main field discharge circuit breaker. When used in the field circuit of the rotating exciter of the main machine, the circuit breaker is designated as an exciter field discharge circuit breaker. *See also:* field discharge circuit breaker. (SWG/PE) C37.100-1992, C37.18-1979r

circuit breaker, general purpose low-voltage dc power A circuit breaker that, during interruption, does not limit the current peak of the available (prospective) fault current and may not prevent the fault current from rising to its sustained value. (SWG/PE) C37.100-1992, C37.14-1999

circuit-breaker grouping The three poles of a circuit breaker grouped in adjacent configuration along the line of the same row. (SWG/SUB/PE) C37.122-1983s, C37.100-1992

circuit breaker, high-speed low-voltage dc power A circuit breaker that, during interruption, limits the current peak to a value less than the available (prospective) fault current. (SWG/PE) C37.100-1992, C37.14-1999

circuit breaker interrupting rating For an unfused circuit breaker, the designated limit of available (prospective) current at which the circuit breaker is required to perform its short-circuit current duty cycle at rated maximum voltage under the prescribed test conditions. This current is expressed as the rms symmetrical value envelope at a time 1/2 cycle after short-circuit is initiated. (For dc breakers, the rated interrupting current is the maximum value of direct current.). (IA/MT) 45-1998

circuit breaker, rectifier low-voltage dc power A circuit breaker that carries the normal current output of one rectifier and that, during fault conditions, functions to withstand and/or interrupt abnormal current as required.

(SWG/PE) C37.100-1992, C37.14-1999

circuit breaker, semi-high-speed low-voltage dc power A circuit breaker that, during interruption, does not limit the current peak of the available (prospective) fault current on circuits with minimal inductance but that does limit current to a value less than the sustained current available on higher-inductance circuits.

(SWG/PE) C37.100-1992, C37.14-1999r

circuit bypass means (bypass) An assembly of parts which, when properly operated, closes the circuit between the line and load jaws. (ELM) C12.7-1993

circuit-commutated turn-off time (thyristor) The time interval between the instant when the principal current has decreased to zero after external switching of the principal voltage circuit and the instant when the thyristor is capable of supporting a specified principal voltage without turning on. *See also:* principal voltage-current characteristic.

(IA/ED) 223-1966w, [46], [62], [12]

circuit components (thyristor) Those electrical controller devices that may conduct current during some part of the cycle. Instrumentation is excluded. *Note:* This definition may include devices within the controller that are used for the suppression of voltage and current transients.

(IA/IPC) 428-1981w

circuit controller A device for closing and opening electric circuits. (EEC/PE) [119]

controlled-speed axle generator An axle generator in which the speed of the generator is maintained approximately constant at all vehicle speeds above a predetermined minimum. *See also:* axle-generator system. (EEC/PE) [119]

controlled system (automatic control) The apparatus, equipment, or machine used to effect changes in the value of the ultimately controlled variable. *See also:* control system. (PE/EDPG) [3]

controlled vented power fuse (installations and equipment operating at over 600 volts, nominal) A fuse with provision for controlling discharge circuit interruption such that no solid material may be exhausted into the surrounding atmosphere. The discharge gases shall not unite or damage insulation in the path of the discharge nor shall these gases propagate a flashover to or between grounded members or conduction members in the path of the discharge when the distance between the vent and such insulation or conduction members conforms to manufacturer's recommendations. (NESC/NEC) [86]

controller (1) (electric pipe heating systems) A device that regulates the state of a system by comparing a signal from a sensor located in the system with a predetermined value and adjusting its output to achieve the predetermined value. Controllers, as used in electric pipe heating systems, regulate temperatures on the system and can be referred to as temperature controllers or thermostats. Controller sensors can be mechanical (bulb, bimetallic) or electrical (thermocouple, resistance-temperature detector [RTD] thermistor). (PE/EDPG) 622A-1984r, 622B-1988r

(2) A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (NESC/NEC) [86]

(3) **(packaging machinery)** A device or group of devices that serves to control in some predetermined manner the apparatus to which it is connected. (IA/PKG) 333-1980w

(4) The component of a system that functions as the system controller. A controller typically sends program messages to and receives response messages from devices. (IM/AIN) 488.2-1992r

(5) (A) A functional unit in a computer system that controls one or more units of the peripheral equipment. *Synonym:* peripheral control unit. *See also:* input-output controller; dual-channel controller. (B) In robotics, a processor that takes as input desired and measured position, velocity or other pertinent variables and whose output is a drive signal to a controlling motor or activator. (C) A device through which one can introduce commands to a control system. (C) 610.10-1994

(6) The entity that initiates RamLink transactions. There is exactly one controller on each RamLink ringlet. (C/MM) 1596.4-1996

(7) A device or group of devices used to control in a predetermined manner the electric power delivered to the apparatus to which it is connected. (IA/MT) 45-1998

(8) **(CAMAC system)** *See also:* CAMAC crate.

(9) *See also:* SBus Controller. (C/BA) 1496-1993w

Controller *See:* SBus Controller.

controller, automatic *See:* automatic controller.

controller characteristics (thyristor) The electrical characteristics of an ac power controller measured or observed at its input or output terminal. (IA/IPC) 428-1981w

controller current (thyristor) The current flowing through the terminals of the controller. (IA/IPC) 428-1981w

controller diagram (electric-power devices) A diagram that shows the electric connections between the parts comprising the controller and that shows the external connections. (IA/IAC) 270-1966w, [60]

controller equipment (thyristor) An operative unit for ac power control comprising one or more thyristor assemblies together with any input or output transformers, filters, other switching devices and auxiliaries required by the thyristor ac power controller to function. (IA/IPC) 428-1981w

controller faults (thyristor) A fault condition exists if the conduction cycles of some semiconductors are abnormal. (IA/IPC) 428-1981w

controller ON-state interval (thyristor) The time interval in which the controller conducts. *Note:* It is assumed that the starting instant of the controller ON-state interval is coincident with the starting instant of the trigger pulse. (IA/IPC) 428-1981w

controller power transformer (thyristor) A transformer within the controller employed to provide isolation or the transformation of voltage or current, or both. (IA/IPC) 428-1981w

controller section (thyristor) That part of a controller circuit containing the basic control elements necessary for controlling the load voltage. (IA/IPC) 428-1981w

controller, self-operated *See:* self-operated controller.

controllers for steel-mill accessory machines Controllers for machines that are not used directly in the processing of steel, such as pumps, machine tools, etc. *See also:* electric controller. (IA/IAC) [60]

controllers for steel-mill auxiliaries Controllers for machines that are used directly in the processing of steel, such as screw-downs and manipulators but not cranes and main rolling drives. *See also:* electric controller. (IA/IAC) [60]

controller, time schedule *See:* time schedule controller.

control line The line, connected to the memory transistor control element, that provides the reference voltage to the memory cell during a read and may provide a high voltage during a write cycle. (ED) 1005-1998

controlling element, final *See:* final controlling element.

controlling elements The functional components of a controlling system. *See also:* feedback control system. (IM/PE/EDPG) [120], [3]

controlling elements, forward *See:* forward controlling elements.

controlling means (of an automatic control system) Consists of those elements that are involved in producing a corrective action. (PE/PSE) 94-1970w

controlling section A length of track consisting of one or more track circuit sections, by means of which the roadway elements or the device that governs approach to or movement within a block are controlled. (EEC/PE) [119]

controlling system (1) (automatic control system without feedback) That portion of the control system that manipulates the controlled system. (IM/PE/EDPG) [120], [3]

(2) **(control system feedback)** The portion that compares functions of a directly controlled variable and a command and adjusts a manipulated variable as a function of the difference. *Note:* It includes the reference input elements; summing point; forward and final controlling elements; and feedback elements. *See also:* feedback control system. (IM/PE/EDPG) [120], [3]

controlling voltage, composite *See:* composite controlling voltage.

control loopback Loopback of output from one function to be control for another function in the same diagram. *Synonym:* feedback. (C/SE) 1320.1-1998

control machine (A) (railroad practice) An assemblage of manually operated levers or other devices for the control of signals, switches, or other units, without mechanical interlocking, usually including a track diagram with indication lights. *See also:* car retarder. (B) **(railroad practice)** A group of levers or equivalent devices used to operate the various mechanisms and signals that constitute the car retarder installation. *See also:* centralized traffic-control system; car retarder. (EEC/PE) [119]

control, manual *See:* manual control.

control mechanism (control systems for steam turbine-generator units) Includes all systems, devices, and mechanisms between a controller and the controlled valves. (PE/EDPG) 122-1985s

no-backoff error A transmission state that results from a transmitter transmitting when there is no carrier, and without waiting for the necessary delay. (C) 610.7-1995

noble potential A potential substantially cathodic to the standard hydrogen potential. *See also:* stray-current corrosion. (IA) [59]

no-busy test call (telephone switching systems) A call in which busy testing is inhibited. (COM) 312-1977w

nochange timing check A timing check similar to a setup/hold timing check except the setup and hold times are referred to opposite transitions of the reference signal. The stable interval is extended to include the period between these transitions; that is, the time for which the reference signal stays in a specified state. This timing check is frequently applied to memory banks and latch banks to establish the stability of the address or to select inputs before, during, and after the write pulse. (C/DA) 1481-1999

nodalization (A) The set of nodes within a system being modeled. (B) The process of developing the nodes as in (A). (C) 610.3-1989

nodal point *See:* node.

nodding-beam height finder A height-finding radar with a fan beam oriented with its narrow beamwidth in elevation, and which mechanically sector scans (nods) in elevation to locate the target and determine its elevation angle. (AES) 686-1997

node (1) **(network analysis)** One of the set of discrete points in a flow graph. (CAS) 155-1960w

(2) **(software)** In a diagram, a point, circle, or other geometric figure used to represent a state, event, or other item of interest. *See also:* graph. (C) 610.12-1990

(3) **(modeling and simulation)** A single entity that is represented in a mathematical model; for example, in a model of a nuclear reactor, a water pump or section of pipe. (C) 610.3-1989w

(4) **(data management)** In a tree, an element that is used to contain information that describes some object; for which there is at least one key used to identify the node. *Note:* Nodes are connected to each other by link fields to form the tree. *Synonym:* vertex. *See also:* terminal node; child node; parent node; nonterminal node; root node. (C) 610.5-1990w

(5) (A) **(broadband local area networks)** A point of junction between two connectors. (B) **(broadband local area networks)** The location where a line has a defined position. (C) **(broadband local area networks)** The point where signals leave one system and enter another. (LM/C) 802.7-1989

(6) In the context of Open Firmware, node is a synonym for device node. *See also:* device node. (C/BA) 1275-1994

(7) A general term denoting either a switching element in a network or a host computer attached to a network. (DIS/C) 1278.1-1995, 1278.2-1995

(8) An entity associated with one or more interconnected lines and optionally containing other functional units, such as cache and memory. In normal operation each node can be accessed independently (a control-register update on one node has no effect on the control registers of another node). (C/MM) 1596-1992

(9) A device or subsystem having one or more link interfaces. A node may be a terminal node (q.v.). A node may perform a routing function, routing packets between its node interfaces according to the information in the destination field of the packet. (C/BA) 1355-1995

(10) A device that consists of an access unit (AU) and a single point of attachment of the access unit to each bus of a DQDB subnetwork for the purpose of transmitting and receiving data on that subnetwork. Adjacent nodes are connected by a transmission link. (LM/C) 8802-6-1994

(11) (A) In networking, a point or a junction in a transmission system where lines or trunks from one or more systems meet.

Synonyms: branch point; junction point; nodal point; vertex. (B) In data communications, a device or station that implements some part of the communication protocol. (C) 610.7-1995

(12) Within a circuit, a point of interconnection between two or more components such as input and output terminals. (C) 610.10-1994w

(13) An addressable device attached to the Serial Bus with at least the minimum set of control registers. Changing the control registers on one node does not affect the state of control registers on another node. (C/MM) 1394-1995

(14) The entity associated with a particular set of control register addresses (including identification ROM and reset command registers) that is initially defined in a 4 Kbyte (minimum) initial node address space. In normal operation each node can be accessed independently (a control register update on one node has no effect on the control registers of another node). (C/MM) 1596.5-1993

(15) The software visible station on a bus. (each node is allocated a set of control register addresses [including identification-ROM and reset command registers], which are initially defined in a 4 kbyte [minimum] initial node address space. Although multiple nodes may share one bus interface, each node can be reset independently [a reset of one node has no effect on any other node]. Each module consists of one or two nodes that are independently initialized and configured by operating system software.) (C/BA/MM) 14536-1995, 13213-1994

(16) A term used to describe a RamLink slave within the context of the CSR Architecture. The entity associated with a particular set of control-register addresses (including identification ROM and reset-command registers). In normal operation each node can be accessed independently (a control-register update on one node has no effect on the control registers of another node). (C/MM) 1596.4-1996

(17) A modeled function located within the hierarchical graph structure of an IDEF0 model by its designated node number; as a function, a node is represented in a diagram by a named box. (C/SE) 1320.1-1998

(18) A set of Control and Status Register (CSR) addresses (including identification read-only memory and reset command registers) that are initially defined in a 4 kB (minimum) initial node address space. Each node can be reset independently (a reset of one node has no effect on other nodes). (C/BA) 1014.1-1994w, 896.2-1991w, 896.3-1993w, 896.4-1993w, 896.10-1997

(19) A conceptual point (through which logic signals pass) that has been identified as an aid to modeling the timing properties of a cell but may not correspond to any physical structure. In Physical Design Exchange Format (PDEF), this is a physical pin that does not correspond to a logical structure. (C/DA) 1481-1999

(20) A Serial Bus device that may be addressed independently of other nodes. A minimal node consists of only a physical layer (PHY) without an enabled link. If the link and other layers are present and enabled they are considered part of the node. (C/MM) 1394a-2000

(21) *See also:* batch node.

node absorption (network analysis) A flow-graph transformation whereby one or more dependent nodes disappear and the resulting graph is equivalent with respect to the remaining node signals. *Note:* For example, a circuit analog of node absorption is the star-delta transformation. (CAS) 155-1960w

nodecast An adjective used to describe an interrupt or message transaction that is distributed to all units on a node. Also used as a verb; e.g., "transactions may be nodecast to all units on a node." (C/MM) 1212-1991s

node controller A component within a node that provides a coordination point for management functions exclusively local to a given node and involving the application, transaction, link, and physical elements located at that node. 6

(C/MM) 1394-1995

paper tape *See*: punch tape.

paper tape reader A reader that senses hole patterns in punched paper tape and translates them into internal machine data representations. *Synonym*: perforated tape reader.

(C) 610.10-1994w

paper throw character *See*: form feed character.

paper traffic *See*: information traffic.

PAR *See*: precision-approach radar.

parabolic approximation *See*: parabolic equation.

parabolic equation Results when the Helmholtz equation is approximated to emphasize preferred propagation in the axial direction, leading to a differential equation of parabolic form. *Synonym*: parabolic approximation. (AP/PROP) 211-1997

parabolic profile (fiber optics) A power-law index profile with the profile parameter, g , equal to 2. *Synonym*: quadratic profile. *See also*: multimode optical waveguide; profile parameter; power-law index profile; graded index profile.

(Std100) 812-1984w

parabolic torus reflector A toroidal reflector formed by rotating a segment of a parabola about a non-intersecting co-planar line.

(AP/ANT) 145-1993

paraboloidal reflector An axially symmetric reflector that is a portion of a paraboloid. *Note*: This term may be applied to any reflector that is a portion of a paraboloid, provided the term is appropriately qualified. For example, if the reflector is a portion of a paraboloid but does not include its vertex, then it may be called an off-set paraboloidal reflector.

(AP/ANT) 145-1993

parachute harness An assembly of webbing, strapping, and attachments, that permits the attachment of a support device (e.g. D-ring), and fits the human such that the entire weight of same can be supported without injury. The lanyard is constructed so that it will support the normal weight of a human, but can be released by pulling on a disconnection means. Upon this action, there will be separation of the body support assembly from the lanyard that has been attached to the harness, thus permitting the movement of the body support means from the human body support assembly. A parachute harness allows separation of the lanyard supporting assembly from an object, commonly an aircraft or helicopter. As released, the force to complete the full separation of the harness is of the order of 1/3 of that required to produce separation resulting from the actuation of the master (main) release (disconnection) means.

(T&D/PE) 1307-1996

paraelastic crystal (primary ferroelectric terms) By analogy with paraelectric crystals, a crystal in which mechanical strain S is a single-valued function of mechanical stress T , whose elastic compliance exhibits an obvious Curie-Weiss behavior with temperature over some given temperature range, and that at some critical temperature T_c undergoes a phase transition to a ferroelastic phase. Crystals that clearly have a paraelastic phase include the metallic alloys Nb_3Sn , $In-Th$, $Au-Zn-Sn$, and lithium ammonium tartrate.

(UFFC) 180-1986w

paraelastic phase (primary ferroelectric terms) A phase that encompasses the range of temperature in which the elastic compliance exhibits Curie-Weiss behavior.

(UFFC) 180-1986w

paraelectric Curie temperature (of a ferroelectric material) The intercept of the linear portion of the plot of $1/\epsilon$ versus T , where ϵ is the small signal dielectric permittivity measured at zero bias field and T is the absolute temperature in the region above the ferroelectric Curie temperature where ϵ generally follows the Curie-Weiss relation. *See also*: ferroelectric domain.

(UFFC) 180w

paraelectric phase (primary ferroelectric terms) Encompasses the range of temperature or pressure over which the permittivity exhibits Curie-Weiss behavior.

(UFFC) 180-1986w

paraelectric region The region above the Curie point where the small signal permittivity increases with decreasing temperature. *See also*: small-signal permittivity; ferroelectric Curie point.

(UFFC) [21]

parallax (computer graphics) The apparent displacement of an object as seen from two different points. It is used to simulate a three-dimensional image on a graphical display device.

(C) 610.6-1991w

parallel (1) (A) (networks) (parallel elements) Two-terminal elements are connected in parallel when they are connected between the same pair of nodes. **(B) (networks) (parallel elements)** Two-terminal elements are connected in parallel when any cut-set including one must include the others. *See also*: network analysis.

(Std100) 270-1966

(2) (A) Pertaining to the simultaneity of two or more processes. **(B)** Pertaining to the simultaneity of two or more similar or identical processes. **(C)** Pertaining to simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word using separate facilities for the various parts. *See also*: serial-parallel.

(C) 162-1963, [20], [85], 270-1966

(3) (radio-wave propagation) Of a propagating wave for which the electric field vector lies parallel to the plane of incidence. *Note*: Sometimes called vertical polarization.

(AP) 211-1977s

(4) (software) Pertaining to the simultaneous transfer, occurrence, or processing of the individual parts of a whole, such as the bits of a character, using separate facilities for the various parts. *Contrast*: serial. *See also*: concurrent.

(C) 610.12-1990

(5) Many bits transmitted over a single pathway simultaneously. *Contrast*: serial. *See also*: bit parallel.

(C) 610.10-1994w

(6) In a propulsion system, the motor circuit in which the final parallel or series-parallel motor connection is achieved and the maximum available per-motor voltage is applied.

(VT) 1475-1999

parallel adder An adder in which addition is performed concurrently on multiple digits of the operands. *Contrast*: serial adder.

(C) 610.10-1994w

parallel addition Addition that is performed concurrently on all digit places of the operands. *Note*: This technique uses partial sums and partial carries to obtain its results. *Contrast*: serial addition.

(C) 1084-1986w

parallel architecture A multiprocessor architecture in which parallel processing can be performed, that is, different parts of a single task can be executed concurrently on different processors. *See also*: fine-grain parallel architecture; medium-grain parallel architecture; coarse-grain parallel architecture.

(C) 610.10-1994w

parallel classes A pair of classes that are distinct, are not mutually exclusive and have a common generic ancestor class and for which neither is a generic ancestor of the other.

(C/SE) 1320.2-1998

parallel computer (A) A computer that has multiple arithmetic units or logic units that are used to accomplish parallel operations or parallel processing. *Contrast*: sequential computer; serial computer. **(B)** A computer design in which more than one operation can occur simultaneously. *See also*: simultaneous computer.

(C) 610.10-1994

parallel-connected capacitance (as applied to interrupter switches) Capacitances are defined to be parallel-connected when the crest value of inrush current to the capacitance being switched exceeds the switch inrush current capability for single capacitance.

(SWG/PE) C37.100-1992

parallel-connected capacitor unit A capacitor unit with the elements connected in parallel groups, with the parallel groups connected in series between the line terminals. A capacitor unit that has only one string of capacitor elements between the capacitor terminals is considered to be parallel-connected power systems relaying.

(PE) C37.99-2000

parallel connection The arrangement of cells in battery made by connecting all positive terminals together and all negative terminals together, the voltage of the group being only that of one cell and the current drain through the battery being divided among the several cells. *See also*: battery.

(EEC/PE) [119]

serial (1) (A) Pertaining to the time sequencing of two or more processes. **(B)** Pertaining to the time sequencing of two or more similar or identical processes, using the same facilities for the successive processes. **(C)** Pertaining to the time-sequential processing of the individual parts of a whole, such as the bits of a character, the characters of a word, etc., using the same facilities for successive parts. *See also:* serial-parallel. (C) 162-1963

(2) (software) Pertaining to the sequential transfer, occurrence, or processing of the individual parts of a whole, such as the bits of a character, using the same facilities for successive parts. *Contrast:* parallel. *See also:* sequential. (C) 610.12-1990

(3) One bit following another over a single pathway. *Contrast:* parallel. *See also:* bit serial. (C) 610.10-1994w

serial access (1) (computers) Pertaining to the process of obtaining data from, or placing data into, storage when there is a sequential relation governing the access time to successive storage locations. (C) [20], [85]

(2) (data management) *See also:* sequential access. (C) 610.5-1990w

serial access storage *See:* sequential access storage.

serial adder An adder in which addition is performed by adding, digit place after digit place, the corresponding digits of the operands. *Contrast:* parallel adder. (C) 610.10-1994w

serial addition Addition that is performed by adding the corresponding digits of the operands, one digit place at a time. *Contrast:* parallel addition. (C) 1084-1986w

serial by bit *See:* serial transmission.

serial bus (1) Intended as a low-cost peripheral connect or an alternate diagnostic and control path. One instantiation of a serial bus is the "Serial Bus" as specified in IEEE P1394. (C/BA) 896.2-1991w

(2) A peripheral interconnect and an alternate diagnostic and control path. (C/BA) 896.10-1997

Serial Bus (1) The name that refers to the IEEE project, P1394, which specifies a serial bus intended as a low-cost peripheral connect or an alternate diagnostic and control path. (C/MM) 1212-1991s

(2) A bit-serial interconnect defined by IEEE P1394. (C/MM) 1212.1-1993

(3) Refers to the IEEE P1394 project, which defines an inexpensive serial network that can be used as an alternate control or diagnostic path, as an I/O connection, or in place of a parallel bus in some systems. (C/MM) 1596.5-1993, 1596-1992

Serial Bus management The set of protocols, services, and operating procedures that monitors and controls the various Serial Bus layers: physical, link, and transaction. *See* figure 34 for the relation of Serial Bus management to the Serial Bus protocol stack. (C/MM) 1394-1995

serial clock driver A functional module that provides a periodic timing signal that synchronizes the operation of IEEE P1132 serial bus. Two backplane signal lines are reserved for use by a serial bus. However, the protocols of the serial bus are completely independent of this standard, and the inclusion of a serial bus is not a required feature of IEEE Std 1014-1987. (C/BA) 1014-1987

serial communication (1) (supervisory control, data acquisition, and automatic control) A method of transmitting information between devices by sending all bits serially over a single communication channel. (SWG/PE/SUB) C37.100-1992, C37.1-1994

(2) Method of transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance. (SUB/PE) 999-1992w

serial computer (A) A computer that has a single arithmetic and logic unit. **(B)** A computer, some specified characteristic of which is serial; for example, a computer that manipulates all bits of a word serially. *Contrast:* parallel computer. (C) 610.10-1994

serial construct A program construct consisting of a sequence of steps not involving a decision or loop. *Synonym:* sequential construct. (C) 610.12-1990

serial digital computer A digital computer in which the digits are handled serially. Mixed serial and parallel machines are frequently called serial or parallel according to the way arithmetic processes are performed. An example of a serial digital computer is one that handles decimal digits serially although it might handle the bits that comprise a digit either serially or in parallel. *See also:* parallel digital computer. (Std100) 270-1966w

serial file *See:* sequential file.

serial interface An interface that transmits data bit by bit rather than in whole bytes. (C) 610.10-1994w

serialization Serialization is the process of transmitting coded characters one bit at a time. *See also:* deserialization. (C/BA) 1355-1995

serializer A device that converts a set of simultaneous signals into a corresponding time sequence of signals. *Synonyms:* parallel-serial converter; dynamicizer. (C) 610.10-1994w

serially correlated variable *See:* lag variable.

serial medium A medium that contains a POSIX.1 extended tar or extended `cpio` archive. (C/PA) 1387.2-1995

serial mouse A mouse that is connected to a computer system through a serial port. *Contrast:* bus mouse. (C) 610.10-1994w

serial operation (data transmission) (telecommunications) The flow of information in time sequence, using only one digit, word, line, or channel at a time. (PE) 599-1985w

serial-parallel Pertaining to processing that includes both serial and parallel processing, such as one that handles decimal digits serially but handles the bits that comprise a digit in parallel. (C) 162-1963w

serial port A port that transfers data one bit at a time. *Contrast:* parallel port. (C) 610.10-1994w

serial printer A printer that receives its input data in the form of a serial stream of data. *Contrast:* parallel printer. *See also:* character-at-a-time printer. (C) 610.10-1994w

serial processing Pertaining to the sequential execution of processes in a single device, such as a processing unit or channel. *Synonym:* sequential processing. *Contrast:* parallel processing. (C) 610.10-1994w

serial protocol Any communication protocol in which data is transferred serially to or from a fixed location. (C/MM) 1155-1992

serial transmission (1) (data transmission) (telecommunications) Used to identify a system wherein the bits of a character occur serially in time. Implies only a single transmission channel. *Synonym:* serial by bit. (PE) 599-1985w

(2) In data communications, the conveying of a character of information one bit at a time on a single path. *Contrast:* parallel transmission. (C) 610.7-1995

series In a propulsion system, the motor connection in which all motors are connected in a series circuit for the purpose of applying to them some fraction (usually one half) of the maximum available per-motor voltage. (VT) 1475-1999

series capacitor A device that has the primary purpose of introducing capacitive reactance in series with an electric circuit. (T&D/PE) 824-1994

series capacitor bank (series capacitor) An assembly of capacitors and associated auxiliaries, such as structures, support insulators, switches, and protective devices, with control equipment required for a complete operating installation. (T&D/PE) 824-1994

series circuit A circuit supplying energy to a number of devices connected in series, that is, the same current passes through each device in completing its path to the source of supply. *See also:* center of distribution. (T&D/PE) [10]

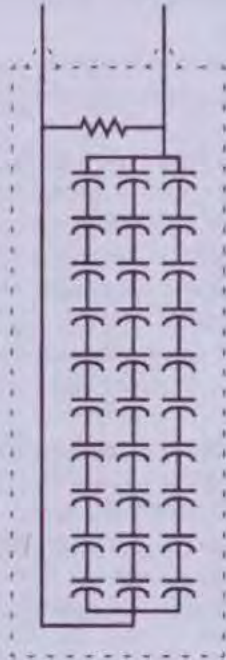
series circuit lighting transformer (power and distribution transformers) Dry-type individual lamp insulating transformer, autotransformer, and group series loop transformers

for operation of incandescent or memory lamps on series lighting circuits such as for street and airport lighting.

(PE/TR) C57.12.80-1978r

series coil sectionalizer A sectionalizer in which main circuit current impulses above a specified value, flowing through a solenoid or operating coil, provide the energy required to operate the counting mechanism. (SWG/PE) C37.100-1992

series-connected capacitor unit A capacitor unit with the elements connected in series with each other between the line terminals, with more than one such series strings within a capacitor unit (see the below figure).power systems relaying.



Series-connected capacitor unit with three strings of 10 elements (showing two shorted elements in one string)

series-connected capacitor unit

(PE) C37.99-2000

series-connected starting-motor starting (rotating machinery) The process of starting a motor by connecting its primary winding to the supply in series with the primary windings of a starting motor, this latter being short-circuited for the running condition. (PE) [9]

series connection The arrangement of cells in a battery made by connecting the positive terminal of each successive cell to the negative terminal of the next adjacent cell so that their voltages are additive. *See also:* battery. (EEC/PE) [119]

series distribution system A distribution system for supplying energy to units of equipment connected in series. *See also:* direct-current distribution; alternating-current distribution.

(T&D/PE) [10]

series elements (A) (networks) Two-terminal elements are connected in series when they form a path between two nodes of a network such that only elements of this path, and no other elements, terminate at intermediate nodes along the path.

(B) (networks) Two-terminal elements are connected in series when any mesh including one must include the others. *See also:* network analysis. (Std100) 270-1966

series-fed vertical antenna A vertical antenna that is insulated from ground and whose feed line connects between ground and the lower end of the antenna. (AP/ANT) 145-1993

series filter A type of filter that reduces harmonics by putting a high series impedance between the harmonic source and the system to be protected. (IA/SPC) 519-1992

series gap (1) (surge arresters) An intentional gap(s) between spaced electrodes: it is in series with the valve or expulsion element of the arrester, substantially isolating the element from line or ground, or both, under normal line-voltage conditions. (PE/SPD) C62.1-1981s

(2) An intentional gap(s) between spaced electrodes in series with the valve elements across which all or part of the im-

pressed arrester terminal voltage appears.

(SPD/PE) C62.22-1997, C62.11-1999

(3) An intentional gap(s) between spaced electrodes. The gap is in series with the valve or expulsion element of the protective device, substantially isolating the element from line or ground, or both, under normal line-voltage conditions.

(SPD/PE) C62.62-2000

series heater (electrical heat tracing for industrial applications) Heating elements that are designed to have a specific resistance at a given temperature for a given length.

(BT/AV) 152-1953s

series heating cable Heating elements that are electrically connected in series with a single current path and have a specific resistance at a given temperature for a given length.

(IA/PC) 515.1-1995, 515-1997

series loading Loading in which reactances are inserted in series with the conductors of a transmission circuit. *See also:* loading. (EEC/PE) [119]

series-mode interference *See:* differential-mode interference.

series modulation Modulation in which the plate circuits of a modulating tube and a modulated amplifier tube are in series with the same plate voltage supply. (EEC/PE) [119]

series noise (of a device) The fraction of electrical noise that can be attributed to a hypothetical white noise generator connected in series with the input of the device.

(NPS) 325-1996

series operation (power supplies) The output of two or more power supplies connected together to obtain a total output voltage equal to the sum of their individual voltages. Load current is equal and common through each supply. The extent of series connection is limited by the maximum specified potential rating between any output terminal and ground. For series connection of current regulators, master/slave (compliance extension) or automatic crossover is used. *See also:* isolation voltage. (AES) [41]

series overcurrent tripping *See:* overcurrent release; direct release.

series-parallel connection The arrangement of cells in a battery made by connecting two or more series-connected groups, each having the same number of cells so that the positive terminals of each group are connected together and the negative terminals are connected together in a corresponding manner. *See also:* battery. (EEC/PE) [119]

series-parallel control A method of controlling motors wherein the motors, or groups of them, may be connected successively in series and in parallel. *See also:* multiple-unit control. (EEC/PE) [119]

series-parallel network Any network, containing only two-terminal elements, that can be constructed by successively connecting branches in series and/or in parallel. *Note:* An elementary example is the parallel combination of two branches, one containing resistance and inductance in series, the other containing capacitance. This network is sometimes called a simple parallel circuit. *See also:* network analysis. (Std100) 270-1966w

series-parallel primary current transformer One that has two insulated primary windings that are intended for connection in series or parallel to provide different rated currents.

(PE/TR) C57.13-1993, [57]

series-parallel starting (rotating machinery) The process of starting a motor by connecting it to the supply with the primary winding phase circuits initially in series, and changing them over to a parallel connection for running operation. *See also:* asynchronous machine. (PE) [9]

Series Parameter A Scalar Series Parameter or a Vector Series Parameter. (IM/ST) 1451.1-1999

series rating The interrupting rating of a tested combination of a line-side (main) overcurrent protective device and a load-side (branch) circuit-breaker in which the interrupting rating of the combination is greater than the interrupting rating of the branch circuit-breaker. The interrupting rating of the se-

ries combination does not exceed the interrupting rating of the main overcurrent protective device.

(IA/PSP) 1015-1997

series rectifier circuit A rectifier circuit in which two or more simple rectifier circuits are connected in such a way that their direct voltages add and their commutations coincide. *See also:* rectifier circuit element; rectification. (IA) [12]

series regulator (power supplies) A device placed in series with a source of power that is capable of controlling the voltage or current output by automatically varying its series resistance. (AES) [41]

series relay *See:* relay; current relay.

series resistor (electric instruments) A resistor that forms an essential part of the voltage circuit of an instrument and generally is used to adapt the instrument to operate on some designated voltage or voltages. The series resistor may be internal or external to the instrument. *Note:* Inductors, capacitors, or combinations thereof are also used for this purpose. *See also:* auxiliary device to an instrument. (EEC/AII) [102]

series snubber (ac adjustable-speed drives) Circuit elements, usually including an inductor, connected in series with a switching device to limit the rate of rise or fall of current through the device when switching on or off, respectively. *See also:* snubber. (IA/ID/SPC) 995-1987w, 936-1987w

series street-lighting transformer (power and distribution transformers) A series transformer that receives energy from a current-regulating series circuit and that transforms the energy to another winding at the same or different current from that in the primary. *See also:* specialty transformer.

(PE/TR) C57.12.80-1978r, [57]

series system The arrangement in a multielectrode electrolytic cell whereby in each cell an anode connected to the positive bus bar is placed at one end and a cathode connected to the negative bus bar is placed at the other end, with the intervening unconnected electrodes acting as bipolar electrodes. *See also:* electrorefining. (EEC/PE) [119]

series tee junction *See:* E-plane tee junction.

series thyristor converter A thyristor converter in which two or more simple converters are connected in such a way that their direct voltages add and their commutations coincide.

(IA/IPC) 444-1973w

series transformer (1) (power and distribution transformers) A transformer with a "series" winding and an "exciting" winding, in which the "series" winding is placed in a series relationship in a circuit to change voltage or phase, or both, in that circuit as a result of input received from the "exciting" winding. *Note:* Applications of series transformers include:

- 1) Use in a transformer such as a load-tap-changing or regulating transformer to change the voltage or current duty of the load-tap-changing mechanism.
- 2) Inclusion in a circuit for power factor correction to indirectly insert series capacitance in a circuit by connecting capacitors to the exciting winding.

(PE/TR) C57.12.80-1978r

(2) A transformer in which the primary winding is connected in series with a power-supply circuit, and that transfers energy to another circuit at the same or different current from that in the primary circuit. *See also:* transformer. (PE/TR) [57]

series transformer rating (power and distribution transformers) The lumen rating of the series lamp, or the wattage rating of the multiple lamps, that the transformer is designed to operate.

(PE/TR) C57.12.80-1978r

series-trip recloser A recloser in which main-circuit current above a specified value, flowing through a solenoid or operating coil, provides the energy necessary to open the main contacts.

(SWG/PE) C37.100-1992

series two-terminal pair networks Two-terminal pair networks are connected in series at the input or at the output terminals when their respective input or output terminals are in series. *See also:* network analysis. (BT) 153-1950w

series undercurrent tripping *See:* direct release; undercurrent release.

series unit (power and distribution transformers) The core and coil unit which has one winding connected in series in the line circuit.

(PE/TR) C57.12.80-1978r

series weighting Response weighting by separating a finger into individual elements with capacitive coupling between them; the elements may be separated from the bus bar.

(UFFC) 1037-1992w

series winding (1) (A) (autotransformer) (power and distribution transformers) That portion of the autotransformer winding which is not common to both the primary and the secondary circuits, but is connected in series between the input and output circuits. (B) **(power and distribution transformers)** The winding of the series unit which is connected in series in the line circuit. *Note:* If the main unit of a two-core transformer is an autotransformer, both units will have a series winding. In such cases, one is referred to as the series winding of the autotransformer and the other, the series winding of the series unit.

(PE/TR) C57.12.80-1978

(2) That portion of the autotransformer winding that is not common to both the primary and secondary circuits, but is connected in series between the input and output circuits.

(PE/TR) C57.15-1999

series-wound (rotating machinery) A qualifying term applied to a machine to denote that the excitation is supplied by a winding or windings connected in series with or carrying a current proportional to that in the armature winding. *See also:* asynchronous machine. (PE) [9]

series-wound motor (1) The conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served. (NESC/NEC) [86]

(2) A dc motor in which the field circuit and armature circuit are connected in series. Speed is inversely proportional to the square root of load torque. Motor operates at a much higher speed at light load than at full load. (IA/MT) 45-1998

servant A device that is controlled by a commander. There are message-based and register-based servants.

(C/MM) 1155-1992

server (1) (telecommunications switching systems) A system component that performs operations required for the processing of a call. *See also:* traffic usage count.

(COM/TA) 973-1990w

(2) **(MULTIBUS II)** An agent that performs a service for clients. *See also:* client. (C/MM) 1296-1987s

(3) In a network, a device or computer system that is dedicated to providing specific facilities to other devices attached to the network. *Contrast:* client. *See also:* mail server; disk server; file server; terminal server; network server; database server; print server. (C) 610.7-1995

(4) The facility in the terminal or work station that provides input (keyboard, mouse) and output (screen graphics) services to the application. *Synonym:* X server. (C) 1295-1993w

(5) The software component on one device that provides services for use by clients on the same or another device.

(C/MM) 1284.4-2000

(6) *See also:* batch server.

Server Object Any Object that executes one or more of its operations in response to a request from a Client object.

(IM/ST) 1451.1-1999

Server Object Tag An attribute of a Client Port that identifies the Object Tag of the Server Object with which the Port communicates in client-server communications.

(IM/ST) 1451.1-1999

Service An instance of a subclass of IEEE1451.Service.

(IM/ST) 1451.1-1999

service (1) (electric systems) The conductors and equipment for delivering electric energy from the secondary distribution or street main, or other distribution feeder, or from the transformer, to the wiring system of the premises served. *Note:* For overhead circuits, it includes the conductors from the last line pole to the service switch or fuse. The portion of an